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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

**APPLICATION FOR LETTERS PATENT**

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Screw Press

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INVENTOR

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## Screw Press

### CROSS REFERENCE TO RELATED APPLICATION

**[0001]** This is a continuation of U.S. Patent Application Serial No. 09/758,380, which was filed on January 10, 2001, by Hugues Dionne, titled "Screw Press", which in turn claimed priority from Canadian Patent Application No. 2,298,235, filed February 8, 2000.

### FIELD OF THE INVENTION

**[0002]** The present invention relates to screw presses. More specifically, the present invention is concerned with a screw press provided with a rear excess fluid outlet.

### BACKGROUND OF THE INVENTION

**[0003]** Screw presses are well known in the art. They are conventionally used for removing soluble and dispersible materials from products, for example, excess fluid from paper pulp. It is to be noted that, for concision purposes, the example of the paper pulp will be used throughout the present disclosure. This should not be construed as a limitation of the present invention.

**[0004]** The principle of operation of conventional screw presses is believed to be well known to those skilled in the art and will therefore only be briefly described herein.

**[0005]** A screw press is basically an endless screw provided with a conical shaft that compresses the pulp as it moves from an inlet to an outlet. The endless screw is enclosed in a body that is provided with a screened surface allowing the excess fluid to be expelled from the pulp.

**[0006]** The throughput of screw presses is usually controlled by the rotational speed of the endless screw. However, there are limits to this control since the rotational speed of the endless screw must be sufficiently slow to thereby allow the excess fluid to flow through the screened body. This is a drawback of the conventional screw presses since it lowers the efficiency of the unit by unduly limiting the top rotational speed of the endless screw.

#### SUMMARY OF THE INVENTION

**[0007]** More specifically, in accordance with the present invention, there is provided a screw press for removing excess fluid from material comprising a generally tubular body having a meshed surface; said body having a material inlet provided near a proximate end thereof; an endless screw mounted in said tubular body; said endless screw including a generally conical shaft and a helicoidal blade mounted to said shaft; and a rear excess fluid outlet provided in said proximate end of said tubular body.

**[0008]** Other advantages and features of the present invention will become more apparent upon reading of the following non restrictive description of preferred embodiments thereof, given by way of example only with reference to the accompanying drawings.

#### BRIEF DESCRIPTION OF THE DRAWINGS

**[0009]** In the appended drawings:

**[0010]** Figure 1 is a side elevational sectional view of a screw press according to an embodiment of the present invention;

[0011] Figure 2 is an enlarged sectional view of the inlet end of the screw press of Figure 1;

[0012] Figure 3 is a perspective view, partly sectional, of a portion of the inlet end of Figure 2;

[0013] Figure 4 is an end view of the endless screw of the screw press of Figure 1; and

[0014] Figure 5 is a sectional view taken along line 5-5 of Figure 4.

#### DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

[0015] This disclosure of the invention is submitted in furtherance of the constitutional purposes of the U.S. Patent Laws "to promote the progress of science and useful arts" (Article 1, Section 8).

[0016] Turning now to Figure 1 of the appended drawings, a screw press 10 according to an embodiment of the present invention will be described.

[0017] As discussed hereinabove, the principle of operation of screw presses is believed well known to those skilled in the art and will not be further discussed in details herein. Furthermore, for concision purposes, various elements and portions of the screw press 10 that do not have a direct impact on the present invention will not be described herein.

[0018] The screw press 10 includes an endless screw 12, provided with a conical shaft 14 and an helicoidal blade 16, and a generally tubular body 18 having a material inlet 20 near a first longitudinal end and a material outlet 22 near a second longitudinal end thereof. The tubular body 18 is provided with meshed elements 24 defining a meshed surface allowing excess fluid to egress therefrom and to be collected in a fluid receiving receptacle 26.

**[0019]** As can be better seen from Figure 2 of the appended drawings, the material inlet 20 includes a raw material inlet 28, a rear toroidal screen 30 defining a rear excess fluid outlet, a fluid expelling conduit 32 and three scraper blades assemblies 34. It is to be noted that the number of scraper blades is not critical and could vary according to the surface of the rear excess fluid outlet.

**[0020]** As will be readily understood by one skilled in the art, the raw material that enters the screw press 10 through the raw material inlet 28 is formed of solid matter mixed with excess fluid. It is at the material inlet 20 that the proportion of solid material to excess fluid is the lowest. It is therefore at the material inlet that a great portion of the excess fluid will egress the screw press 10 (see arrows 36) through the meshed elements 24. The added rear toroidal screen 30 allows excess water to egress faster from the material inlet 20 of the screw press 10 (see arrows 38) since the meshed surface is increased near the material inlet 20, thereby increasing the available top rotational speed of the endless screw 12.

**[0021]** Indeed, it has been found that the limitation of the top rotational speed of the endless screw 12 is mainly due to the inefficiency of conventional screw presses to allow the excess fluid to egress the material inlet 20 thereof quickly enough. By increasing the screened surface in the material inlet 20, it is possible to significantly increase the flow of excess fluid out of the material inlet to thereby increase the available top rotational speed of the endless screw 12.

**[0022]** The fluid conduit 32 allows the egressing fluid to flow in the fluid receptacle 26.

**[0023]** As will be apparent to one skilled in the art, it is advantageous to prevent solid matter from clogging the screened surfaces of the body 18 since it would decrease the efficiency of fluid removal.

**[0024]** The scraper blades assemblies 34, which may be better seen from Figure 3 of the appended drawings, are so mounted to the end of the endless screw 12 as to contact the rear toroidal screen 30 in such a manner that the rotation of the endless screw 12 induces a scraping action against the screen 30. Of course, this contact is not necessary since a near-contact is generally sufficient to prevent the clogging of the toroidal screen 30. Clogging of the circular screen 30 is therefore prevented by the scraper blade assemblies 34.

**[0025]** Turning now more specifically to Figures 4 and 5 of the appended drawings, the scraper blade assemblies 34 will be described in greater detail.

**[0026]** As can be seen from Figure 4, each scraper blade assembly 34 includes a support 40 mounted to the endless screw 12 and a movable scraper blade 42 mounted to a corresponding support 40.

**[0027]** Figure 5 illustrates a sectional portion of one of the scraper blade assemblies 34. As can be seen from this figure, the movable scraper blade 42 is mounted to the support 40 via three machine screw fasteners 44 (only one shown in Figure 5) that are inserted in oblong apertures 46 of the scraper blade 42. The oblong shape of the apertures 46 thereby allow the adjustment of the scraper blade 42 to ensure an adequate cleaning of the rear toroidal screen 30.

**[0028]** Although the present invention has been described hereinabove by way of preferred embodiments thereof, it can be modified, without departing from the spirit and nature of the subject invention as defined in the appended claims.

[0029] In compliance with the statute, the invention has been described in language more or less specific as to structural and methodical features. It is to be understood, however, that the invention is not limited to the specific features shown and described, since the means herein disclosed comprise preferred forms of putting the invention into effect. The invention is, therefore, claimed in any of its forms or modifications within the proper scope of the appended claims appropriately interpreted in accordance with the doctrine of equivalents.